Cover Stories:

Major Scientific Publications Featuring NRI-Funded Research

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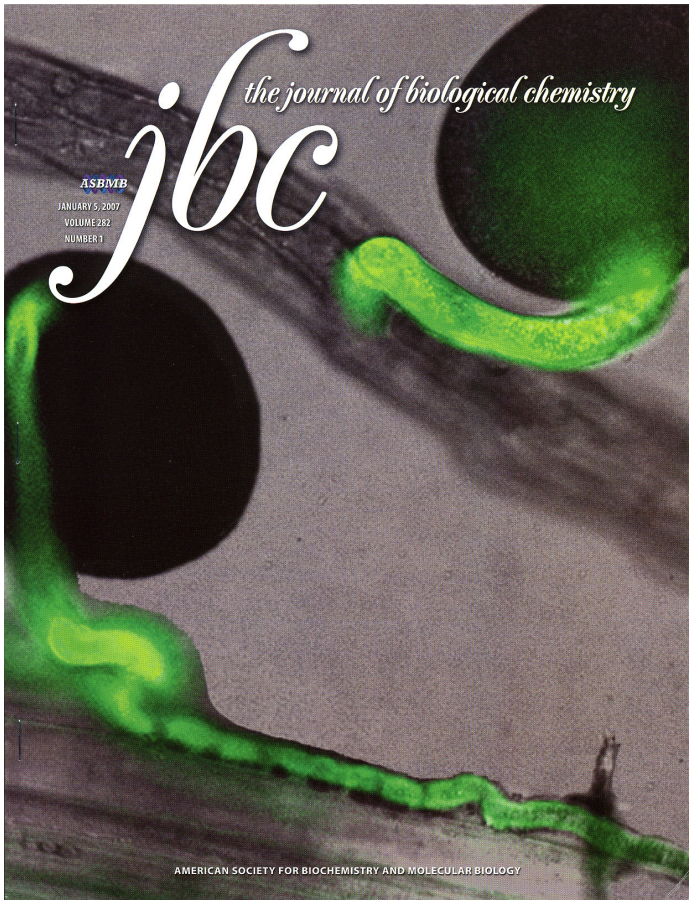
D. Suen and A.H.C. Huang, 2007, Maize pollen coat xylanase facilitates pollen tube penetration into silk during sexual reproduction. *Journal of Biological Chemistry,* 282(1): 625-636.



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Manipulation of sexual reproduction in crops can enhance productivity in two ways. Promoting sexual reproduction could enhance the yield of fruits and seeds, whereas suppressing the process could increase the yield of leafy vegetables. In addition, modification of the reproduction mechanism can eliminate self-incompatibility in some crops. The technology of producing male sterility can be used to generate hybrid seeds and seedless fruits as well as abort pollen of genetically modified (GM) crops.

The first step in sexual reproduction is the union of the male sperm (pollen) and the female egg in flowers. In corn, one of the most important U.S. agricultural crops, pollen produced in the male flowers lands on the silk of the female flower. A pollen grain produces a sperm-containing tube that penetrates the silk (upper green image on the journal cover) and advances to the egg. Prior to silk penetration, the pollen produces a wall-digestive enzyme, called xylanase, which breaks down the silk wall allowing the pollen to gain access. Elimination of the xylanase by an anti-sense technique prevents the pollen tube from penetrating the silk, and grows along the silk instead (lower green image on the journal cover).

The findings of this project illustrate how a pollen-released enzyme, which may cause allergic problems in people, is necessary for successful sexual reproduction in corn and other grasses. The findings also show the potential of using genetic techniques to eliminate a specific pollen protein and thus avoid sexual reproduction that would eliminate the spread of noxious weeds and pollen from GM crops.

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